

# Economic Potential and Impacts of United States Offshore Aquaculture

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Presented at Aquaculture America 2006  
Las Vegas, Nevada  
February 16, 2006

## About myself

- Economist at the University of Alaska Anchorage
- Conduct research on the seafood industry
- One of a group of economists conducting economic study of offshore aquaculture for NMFS
- Opinions in this presentation are my own
  - Not representing other study participants, NMFS, Alaska fishermen, etc.

The United States is engaged in an important policy discussion about national offshore aquaculture policy. This discussion raises a number of economic questions:

1. What is the economic potential for U.S. offshore aquaculture?
  - Is offshore aquaculture economically feasible?
  - At what scale?
2. What would be the economic impacts of U.S. offshore aquaculture?
  - Jobs & income
  - Seafood prices
  - Balance of trade
  - Distribution of impacts (which industries, regions, etc.)
  - Indirect economic impacts (environment, other industries, etc.)

One challenge in assessing the economic potential for and economic impacts of U.S. offshore aquaculture is that the offshore aquaculture industry is still in its infancy.

- There has been only limited experience with offshore aquaculture.
- Looking into the future, we don't know
  - what offshore aquaculture technologies may evolve
  - what offshore production technologies will cost
  - what feed will cost
  - What prices of fish and other foods will be
- The farther we look into the future,
  - The less certain we are about technologies, costs and prices
  - The greater the potential scale and impacts of offshore aquaculture

## Two approaches for analyzing uncertain future economic potential and economic impacts

### **MODELING APPROACH**

- Make reasonable and internally consistent assumptions about future trends in technology, costs and prices
- Examine the implications of these assumptions for economic potential and impacts of U.S. offshore aquaculture
- Examine the implications of modifying key assumptions

### **COMPARATIVE APPROACH**

- Look at how similar industries have developed (or not) in the United States and other countries
  - Other kinds of aquaculture
  - Other kinds of agriculture
  - Other resource producing industries
- Ask what implications about U.S. offshore aquaculture may reasonably be drawn from these experiences

The economic potential for and impacts of U.S. offshore aquaculture will depend on how it is regulated.

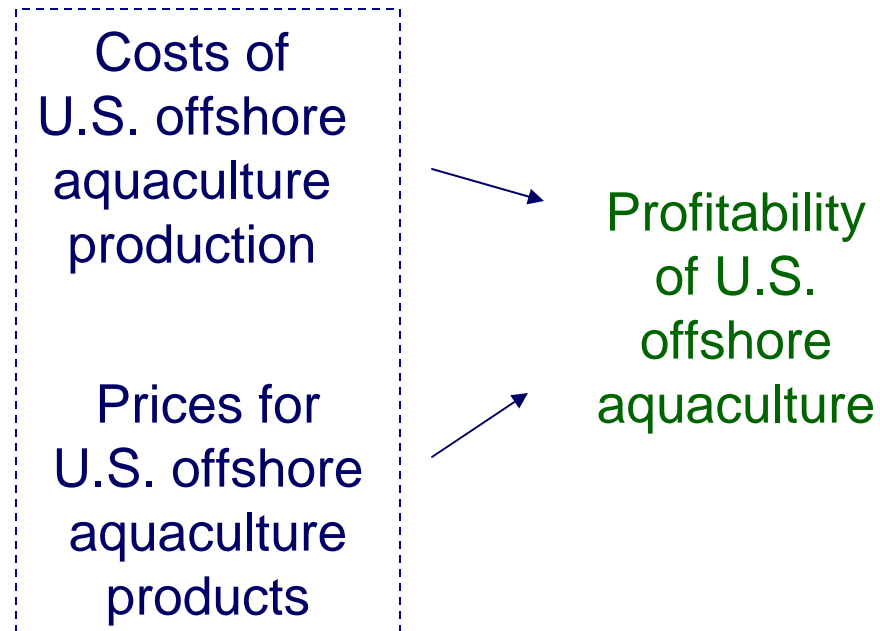
How offshore aquaculture is regulated will affect:

- Whether any U.S. offshore aquaculture industry develops
- Where and how the industry develops
- How rapidly offshore aquaculture develops
- The future scale of U.S. offshore aquaculture production
- The nature and scale of economic impacts

In thinking about the economic potential and impacts of U.S. offshore aquaculture, the real question is not:  
*“what will the future be?”*

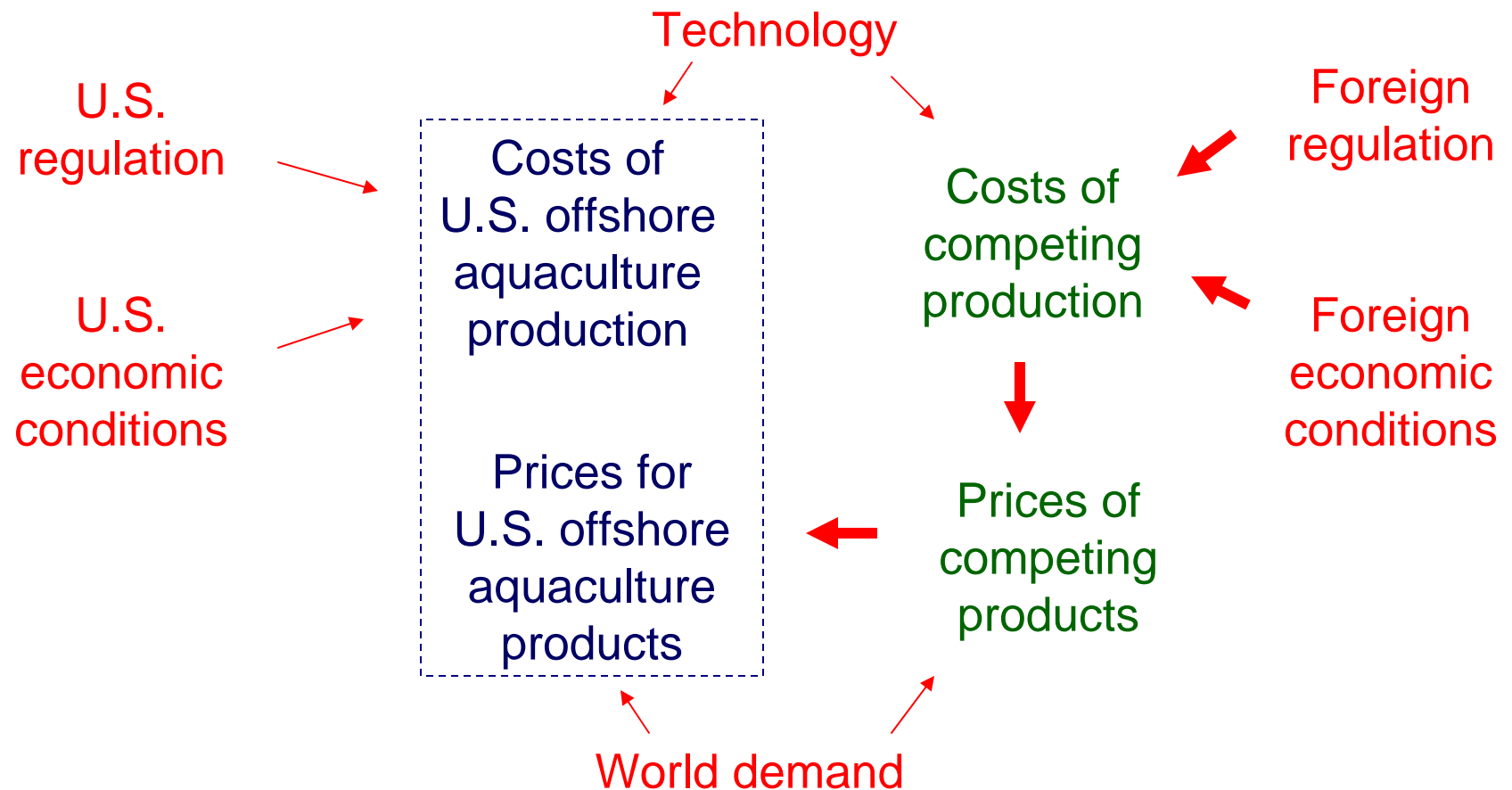
The real question is:  
*“what future do we want?”*

The economic potential for U.S. offshore aquaculture depends on both costs and prices.





Costs and prices for U.S. offshore aquaculture will depend on many factors. Of particular importance is the relative costs of other competing producers—which will drive prices of competing products and limit prices for U.S. offshore aquaculture.



If technology evolves to allow profitable offshore aquaculture production anywhere, it seems likely that the United States could compete successfully in offshore aquaculture production.

### COMPETITIVE ADVANTAGES

- diverse and favorable water conditions.
- high level of technology.
- well-developed infrastructure.
- skilled labor
- lowest transportation costs to U.S. markets
- very competitive in animal farming industries (chicken, beef, etc.)

### COMPETITIVE DISADVANTAGES

- high labor costs
- high values of competing coastal uses
- less developed infrastructure and higher costs in some regions (Alaska)

U.S. competitive disadvantages are relatively less significant for offshore aquaculture than for other kinds of aquaculture.

- Offshore aquaculture is less labor intensive
- Offshore aquaculture has fewer direct conflicts with other competing coastal uses than nearshore aquaculture
  - Reduced effects on water quality
  - Reduced visual conflicts
  - Reduced space conflicts

Without an enabling regulatory structure U.S. offshore aquaculture will not develop.

- An ambivalent-to-hostile regulatory structure has significantly slowed the development of U.S. coastal marine aquaculture
- Unclear regulatory structures and political opposition add to costs directly and create significant political risk

The real test of the economic potential  
for U.S. aquaculture is not economic studies.  
It is the market.

- The only way we will know if U.S. offshore aquaculture is feasible is to let investors try it.
- The fact that investors want to try it suggests that U.S. offshore aquaculture may be feasible.

Profitable new industries do not succeed because of government-sponsored “intelligent design.”

- Profitable new industries arise because many new ideas are tried--and some work.
- Government can best stimulate development of new industries by allowing and encouraging new ideas to be tried.
- Offshore aquaculture may become a profitable new industry for the United States.
  - There is no guarantee it will succeed.
  - It will only happen if we allow it to be tried.

There are a variety of potential economic benefits to the United States and coastal regions from offshore aquaculture.

- Jobs and income
  - in offshore farming
  - in support activities for offshore farming
  - in fish processing
  - in feed production
  - in manufacture of equipment and supplies
- Economic diversification for coastal communities
- Royalties and tax income
- Reduction of U.S. fisheries trade deficit
- Potential synergies with wild fisheries
  - More efficient utilization of processing facilities
  - More efficient utilization of other infrastructure (ports, roads)
  - Markets for wild fisheries by-products as fish feed

United States companies are leaders in aquaculture technology.

**10 INNOVATION**

*US company Northwest Marine Technology (NMT) plans to have an automated fish vaccination system ready for production by September.*

*Senior research scientist Lee Blankenship speaks to **ANTHONY HILDEBRAND** about his company's innovation*

**Automated vaccination!**

**Cage 'net' revolution!**

US COMPANY Ten Cate Nicolon has introduced what it claims is the first ever containment net designed specifically for aquaculture applications: Aquagrid.

Traditional nylon and polyester nets used in aquaculture were designed to catch fish, not contain them," says Mark Gunzenhauser, Ten Cate Nicolon's director of strategic markets.

"Aquagrid semi-rigid mesh is the first net created specifically for aquaculture applications."

has a number of other the nylon and traditionally used in says Ten Cate Nicolon

ause micro-attach as nylon," he our maintenance.

anti-fouling required. ronment Gunzenhauser.

Unlike traditional netting, which requires can easily

and can even be done with hog rings or zip-ties.

The routine also prevents

\$6067, compared to \$811 for a conventional nylon ne

"What we found out w

**Fish flow direction**

**Vaccination point**

Fish Farming International May 2004



The economic benefits of offshore aquaculture would be distributed widely.

- Direct employment on or supporting offshore aquaculture facilities would likely be much smaller than the employment created in processing, distribution, feed supply, equipment manufacture, and other industries.
- The employment created in these other industries is not limited to coastal industries but would occur nationally.

Benefits of offshore aquaculture to local communities would depend upon:

- The regulatory structure:
  - Local hire requirements
  - Local landing requirements
  - Local taxing authority
- Skills of local residents
- Willingness of local residents to work in the industry

Marine aquaculture has potential environmental costs.

- Pollution
- Disease
- Escapes
- Navigational hazards
- Aesthetic/visual effects

These environmental costs tend to be reduced by moving aquaculture offshore.

- Reduced aesthetic/visual effects
- Less concentration of pollutants because of deeper water and greater water flow through pens
- Farther from large concentrations of migrating fish (e.g. returning salmon)

The nature and significance of environmental costs of offshore aquaculture depends on what is farmed, how it is farmed and where it is farmed.

- There are significant differences between species which might be farmed in offshore aquaculture.
- There are significant differences between different regions of the U.S.
  - in what kinds of wild stocks are present
  - in what other coastal activities are present

The nature and significance of environmental costs associated with offshore aquaculture depends on how it is regulated.

- Which species are allowed to be farmed
- Where farms are allowed to be situated
- How farms are allowed to operate

There is no obvious reason why most potential environmental costs of offshore aquaculture could not be addressed through regulation.

It would be impossible to reduce potential environmental risks of offshore aquaculture to zero. If we insist on zero environmental risk:

- Offshore aquaculture will be impossible
- We will be imposing a higher standard than we do for other kinds of food production
- We will be imposing a higher standard than we do for other uses of the marine environment
  - Wild fisheries
  - Salmon hatcheries
  - Marine transportation
  - Offshore oil production

Aquaculture can have significant negative impacts on markets for wild fisheries.

- Examples:
  - Effects of salmon farming on prices of wild salmon
  - Effects of shrimp farming on prices of wild shrimp
- Aquaculture has significant market advantages over wild fisheries:
  - Consistency of supply
  - Control over production volume, production timing, product quality



The market impacts of aquaculture will occur regardless of the extent of United States offshore aquaculture production.

- Alaska's salmon farming ban did not stop the market impacts of farmed salmon on wild Alaska salmon.
- The fact that U.S. farmed shrimp production is an almost insignificant part of world production has not stopped the market effects of farmed shrimp on U.S. wild shrimp producers.
- In a global seafood market, all aquaculture production affects wild fisheries markets:
  - U.S. wild fisheries are heavily dependent on export markets
  - The most significant effects of farmed salmon on markets for Alaska wild salmon occurred in Japan.

Lower prices are bad for fishermen but good for consumers.

- The United States has many more fish consumers than wild fish producers.
- Most kinds of food have been getting cheaper.
- Most Americans welcome lower food prices.

Market competition from aquaculture can stimulate positive changes in wild fisheries.

- Prior to aquaculture, wild fisheries had a natural monopoly on fish production.
- Under the protection of this natural monopoly, many wild seafood industries exhibited characteristics of monopolies:
  - Excess capital
  - Low labor productivity
  - Lack of innovation
  - Slow response to changing market demand
- Wild fisheries forced to compete with aquaculture have begun to address these problems
- Ultimately, competition for industries and countries—while painful and difficult—can also make industries stronger.